

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Erforschung biologischer Ressourcen der Mongolei
/ Exploration into the Biological Resources of
Mongolia, ISSN 0440-1298

Institut für Biologie der Martin-Luther-Universität
Halle-Wittenberg

2016

Offspring Survival in the Demoiselle Crane *Grus virgo* in Mongolia

Ueli Rehsteiner

Chur, Switzerland, ureh@gmx.ch

Follow this and additional works at: <http://digitalcommons.unl.edu/biolmongol>



Part of the [Asian Studies Commons](#), [Biodiversity Commons](#), [Environmental Sciences Commons](#), [Nature and Society Relations Commons](#), and the [Other Animal Sciences Commons](#)

Rehsteiner, Ueli, "Offspring Survival in the Demoiselle Crane *Grus virgo* in Mongolia" (2016). *Erforschung biologischer Ressourcen der Mongolei / Exploration into the Biological Resources of Mongolia*, ISSN 0440-1298. 181.
<http://digitalcommons.unl.edu/biolmongol/181>

This Article is brought to you for free and open access by the Institut für Biologie der Martin-Luther-Universität Halle-Wittenberg at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in *Erforschung biologischer Ressourcen der Mongolei / Exploration into the Biological Resources of Mongolia*, ISSN 0440-1298 by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Erforsch. biol. Ress. Mongolei (Halle/Saale) 2016 (13): 281-286

Offspring survival in the Demoiselle Crane *Grus virgo* in Mongolia

U. Rehsteiner

Abstract

The breeding performance of nine breeding pairs of the Demoiselle Crane *Grus virgo* has been investigated in Takhin Tal, Mongolia, in order to get information about their breeding density as well as the survival rate of the juveniles. To this end, the nests and the offspring have been monitored from hatching up to the age of about two months in order to get information about their survival rate. All pairs settled within a distance of about 2 km to the only river in the area, resulting in a density of about 0.6 couples per km. The number of surviving juveniles decreased to the level of 56 % until about the age of 50 days and mid-August, respectively. Afterwards, it remained stable. Provided there are no significant changes from one year to another the data indicate the time of the year after which offspring mortality becomes negligible. These observations allow estimating reliably the seasonal population size as well as the breeding success based on a few counts only.

Key words: Demoiselle Crane, *Grus virgo*, Mongolia, breeding performance, survival rate, offspring

Introduction

The Demoiselle Crane *Grus virgo* is a ground-breeding bird living in open habitat (BANKOVICS 1987, FUJITA et al. 1994). Currently its breeding range extends from the Black Sea to northeastern China. The species suffers several threats like habitat destruction and illegal hunting (MEWES et al. 2003) which caused its distribution as well as the population size to deteriorate substantially during the past decades. However, with an estimated population of 230,000 – 280,000 mature individuals, they are categorized currently by the IUCN Red List as „least concern“ (www.bird-life.org). In Mongolia, the Demoiselle Crane as a migratory species is quite common during the breeding season (BANKOVICS 1987).

The Demoiselle Crane is the smallest crane species but, like many other cranes, it is capable of defending the nest and the juveniles aggressively. In spite of its wide distribution, however, few if any data are available about its breeding success (CRAMP & PERRINS 1980, DEL HOYO et al. 1992).

In this project, Demoiselle Cranes were observed in Takin Tal, Mongolia, in order to learn about their population size as well as the breeding performance and survival rate of juveniles after hatching. The main questions to be answered were:

- (1) How many pairs are breeding in the study area?
- (2) How do Demoiselle Cranes perform their reproduction?
- (3) How does the survival rate of the juveniles evolve in the course of time?

Study area and methods

The study area is located in Takhin Tal in the Dzungarian Gobi desert in the Mongolian Gobi-Altai Aimag (district) near the river Bij just outside the northeastern border of the 'Great Gobi B Strictly Protected Area' (93°36'/45°32', fig. 1). The river Bij flows from the Altai Mountains into the steppe-desert where it disappears after about 20 km. The amount of water it contains varies considerably with time because it is interrupted by a retaining lake in the mountains near the village Bij.

Vegetation is sparse and fragmentary in the steppe, in most sites it covers no more than about 20 % of the ground. However, at some places along the river artificial irrigation caused some meadows to grow. These sites were patchy and hardly ever exceeded about one hectare per site. The climate in Takhin Tal is extremely continental. During the project, air temperature ranged from -4°C to $+38^{\circ}\text{C}$.



Fig. 1: Map of Mongolia with the position of the study area in the rectangle. Ulaanbaatar is the capital of Mongolia (source: <http://upload.wikimedia.org/wikipedia>).

Field observations

The observations lasted from April 13 until 26 August 2001. The first migrating Demoiselle cranes arrived on 18 April, but many birds stayed there only for a few days before flying on to the north. Regular observations were initiated on 25 May along the river Bij, the only place in the area where cranes reproduced, and continued until 26 August with 12 additional and more or less weekly counts.

In the course of these counts the location of breeding pairs, nests, and families with juveniles were mapped. Regular visits to these families after hatching of the juveniles provided information about their survival rate. Its time dependence was obtained by referring the number of offspring alive at any one time to the number of juveniles hatched. This way survival rates relative to both date and age were obtained.

In one case of a failing brood it could not be determined whether the loss occurred before or shortly after hatching. This case was excluded from the calculations. In two territories, the juveniles were detected after hatching only. The chicks' ages as well as the hatching date were estimated based on their size.

The distances between neighbouring nests were measured in order to get data about breeding density.

Data analysis

Survival rate depending on time was obtained by relating the number of young cranes found in any one count to the total number of juveniles hatched by the time of the count. In addition, the survival rate in relation to age was calculated as the proportion of juveniles surviving every ten days of age up to 70 days (independent of their individual hatching date).

Results

Population size and breeding density

Nine breeding pairs settled within a distance of about 15 km on both sides of the river Bij resulting in an average breeding density of 0.6 couples per km. The nest closest to a human settlement was found about 500 m from the village Bij.

The average distance between neighbouring nests was 2.3 ± 1.4 km (range: 0.73 - 5.2 km; median: 1.9 km; $n = 15$ measurements). No nests were found farther away from the river than 1.5 km. Individual families moved no more than 2.3 km away from the river.



Fig. 2: A flock of Demoiselle cranes after their arrival in the study area.

Temporal breeding performance

Hatching took place around the medial hatching date of 12 June ($n = 8$, range: 7 June - 30 June). The offspring of all broods except one hatched between 7 June and 14 June. Assuming an incubation period of 27 - 29 days (FUJITA et al. 1994), egg laying started on about 9 - 11 May.

Survival rate

Some 15 to 16 juveniles were observed hatching in eight broods. In one additional brood, no juveniles could be noticed, and it is uncertain whether the eggs or newly hatched juveniles had disappeared. Thus, referring to the eight "certain" broods; hatching success was 94 to 100 %. Based on all nine broods, it was at least 83 %.

Some three weeks after hatching the survival rate of all juveniles together had dropped to 80 %, and one week later to about 60 % (fig. 5). By mid-August, i.e., some 50 days after hatching, the survival rate in eight broods was 56 % and remained stable afterwards (fig. 5 and 6).



Fig. 3: A young Demoiselle Crane shortly after hatching. The egg to its left is about to be opened by the egg tooth of a second hatchling.



Fig. 4: An adult Demoiselle Crane together with a young one about three weeks old (the picture was taken in 2011 near Hustai National Park).

A total of nine juveniles, or one offspring per pair, survived by the end of August, i.e. by the time autumn migration started.

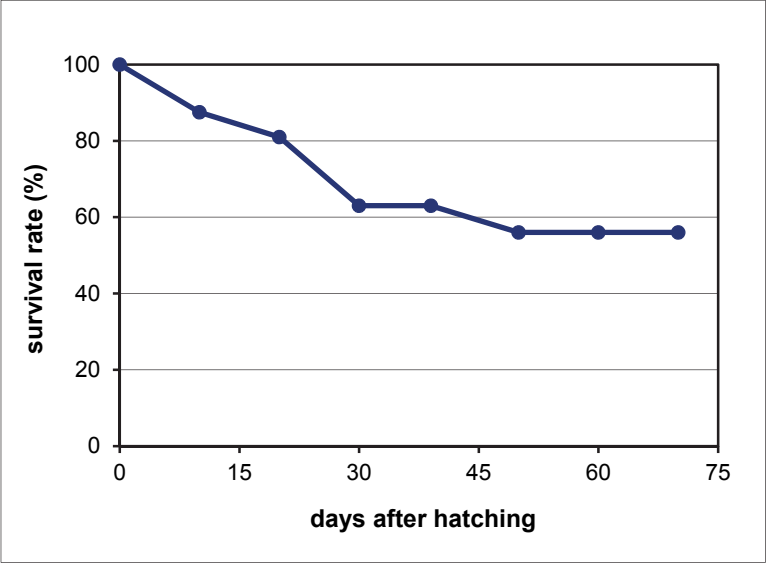


Fig. 5: Survival rate of Demoiselle crane juveniles in eight broods related to age.

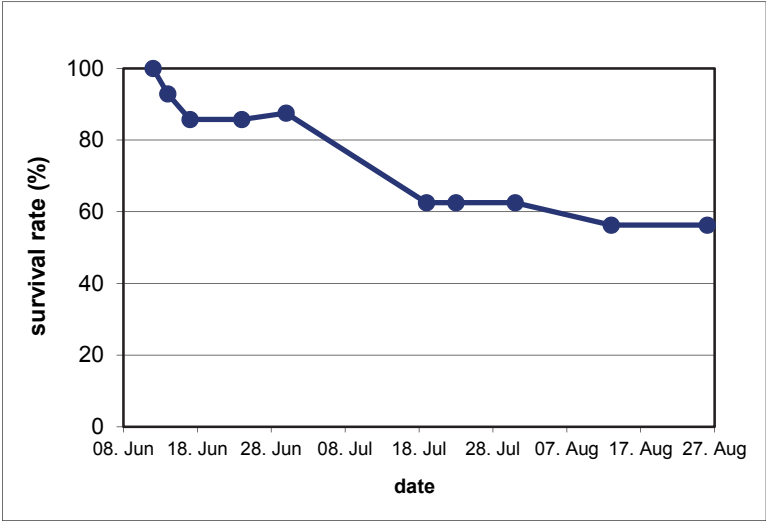


Fig. 6: Survival rate of Demoiselle crane juveniles in eight broods related to date.

Discussion

With one exception, breeding of Demoiselle Cranes in Takhin Tal started almost simultaneously during the first half of May, and the offspring hatched in the first half of June. This simultaneous breeding behaviour may be interpreted as an adaptation to the short time span available where favourable climatic and feeding conditions prevailed. Breeding took place mostly near the Bij river. This suggests that the Demoiselle Crane, as an inhabitant of the steppe, depends strongly on the humidity provided by the river for raising offspring. In a region, however, where humid areas are not restricted to a river like in Tahkin Tal, the birds might spread out over a larger area.

At the age of about 50 days, no further offspring mortality was observed any more. Provided the breeding performance in Takhin Tal does not fluctuate severely from one year to another, counts taken around mid-July or, even better, around mid-August provide reliable information about the number of juveniles produced. Good information about local population size is obtained by counts at the end of April/beginning of May. Obviously, the observations reported here allow meaningful conclusions based on a moderate observation effort: one or two counts in May to know the number of breeding pairs, and one or two counts of the number of offspring between mid-July and mid-August.

Literature:

- BANKOVICS, A. (1987): Some data on the distribution and habitat of the Demoiselle Crane in Mongolia. - Proc. 1983 Int. Crane Workshop; p. 33-34. - Bharatpur, India.
- CRAMP, S.; PERRINS, M. (1980): The birds of the Western Palearctic, Vol. II. - Oxford University Press, Oxford-New York.
- DEL HOYO, J.; ELLIOTT A.; SARGATAL, J.; CHRISTIE, D.A. (1992): Handbook of the Birds of the World. - Lynx Edicions, Barcelona.
- FUJITA, G.; HARRIS, J.; BOLD, A.; TVEENMAYADAG, N.; CHULUUNBATAR, S. (1994): Habitat preference of Demoiselle and White-naped Cranes, *Anthropoides virgo* and *Grus vipio*, breeding in Mongolia. - The Future of Cranes and Wetlands, p. 93-96. - Tokyo and Sapporo, Japan. Wild Bird Society of Japan, Tokyo.
- JOHNSGARD, P.A. (1983): Cranes of the world: Demoiselle Crane (*Anthropoides virgo*). - Indiana University Press, Bloomington.
- MEWES, W.; NOWALD, G.; PRANGE, H. (2003): Kraniche: Mythen, Forschung, Fakten. - G. Braun Verlag, Karlsruhe.

Zusammenfassung

Das Brutgeschäft von neun Paaren des Jungfernkranichs *Grus virgo* wurde in Takhin Tal in der Mongolei untersucht, um Informationen zu Siedlungsdichte und Aufzuchterfolg zu erhalten. Dazu wurden die anwesenden Paare während der Bebrütungsphase sowie Familien nach dem Schlüpfen der Jungvögel regelmäßig beobachtet. Sämtliche Paare brüteten entlang des einzigen Flusses in der Gegend, der aus dem Altaigebirge etwa 20 Kilometer in die angrenzende Steppe floss. Die Dichte betrug ca. 0,6 Paare pro Kilometer, die Vögel entfernten sich kaum weiter als zwei Kilometer vom Fluss. Die Überlebensrate der Jungvögel erreichte im Alter von etwa 50 Tagen bzw. Mitte August 56 % und blieb danach stabil bis zum Abzug der Vögel aus dem Gebiet. Vorausgesetzt, das Brutgeschäft läuft alljährlich ungefähr nach dem gleichen Muster ab, ermöglichen die hier präsentierten Daten die Durchführung eines einfachen, aber aussagekräftigen Monitorings: Ein bis zwei Zählungen Ende April/Anfang Mai ermöglichen die Feststellung der anwesenden Brutpaare, zwischen Mitte Juli und Mitte August lässt sich die saisonale Jungenproduktion erheben.

Address: Dr. Ueli Rehsteiner
Pargherastrasse 43
CH-7000 Chur
Switzerland

e-Mail: ureh@gmx.ch